

FURTHER NOTES ON THE CLAVAGELLIDAE, WITH SPECULATION ON THE PROCESS OF TUBE GROWTH

BRIAN J. SMITH

National Museum of Victoria, Melbourne, Victoria.

INTRODUCTION

Following the publication of revisionary work on the family Clavagellidae (Smith 1971, 1976), an opportunity was taken to examine collections and libraries in several European museums. In the Museum d'Histoire Naturelle, Paris, several important specimens were discovered, including a hitherto unrecognised Lamarck type, and two important papers, previously overlooked, were brought to my notice.

REMARKS

In the revision of the Australian clavagellids (Smith, 1971), *Aspergillum agglutinans* Lamarck, 1818 was placed in the synonymy of *Brechites (Foegia) novaezelandiae* (Bruguiere, 1789). It was stated that no type specimen of *A. agglutinans* could be found in the Paris or Geneva Museums. Two syntypes of *A. novaezelandiae* Chenu, 1843 were the only types of any of the synonyms of *B. (F.) novaezelandiae* which could be found at that time. On a recent trip to Paris I discovered a specimen of *A. agglutinans* which, after examination of the labels and comparison with figures, was identified as the type of that species. The specimen was broken and a drawing of the anterior part showing the position of the valves and tubules, drawn from a colour transparency of the specimen, is given here. The type locality is given as New Holland and the collectors as Peron and Lesueur, 1801. This specimen confirms the placement of this species in the synonymy of *B. (F.) novaezelandiae*, since the valves are partially covered by swollen prominences and the tubules of the anterior end are not arranged into a disc with a distinct fringe. Width of the swollen anterior end at its widest point is 13 mm.

Several specimens in the collections in Paris carried unfamiliar names attributed to Jousseume. With the valuable assistance of M. Tillier of that institution, two papers overlooked in the earlier work were brought to my notice. These were one by Jousseume (1888) in which he erected the name *Clavagella adenensis* for clavagellid specimens from Aden and Djibouti in the Red Sea and one by Lamy (1923) based on manuscript notes of Jousseume, redescribing the above species and describing three other Jousseume manuscript names, *Briopa socialis*, *Bryopa senilis* and *Bryopa astraicicola*. Lamy attributed all four species to Jousseume indicating by quotation marks that the descriptions and other information were transcribed direct from manuscript notes of Dr. Jousseume. Because the name *Clavagella adenensis* was proposed without an adequate description (Jousseume, 1888) it is here considered a *nomen nudum*. It was first properly proposed and described in Lamy (1923) under the name *Bryopa adenensis*. In that work Lamy makes it clear that the descriptions and names should be attributed to Jousseume, so these four species of *Bryopa* should be cited as Jousseume in Lamy 1923.

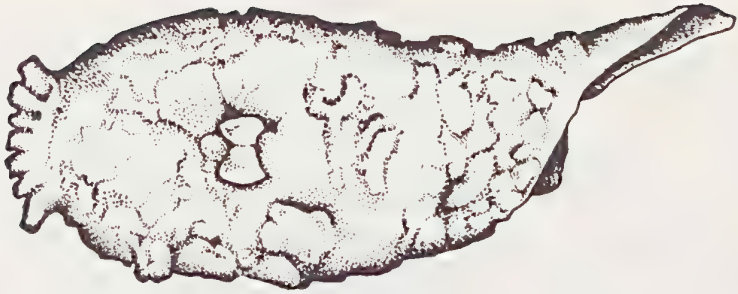


Figure 1. Holotype of *Aspergillum agglutinans* Lamarck, 1818 (= *Brechites* (*Foegia*) *novaezelandiae* (Bruguiera, 1789)).

In this paper Lamy suggests that the four species are so similar that the characters used in their separation could be attributed to individual variation brought about by the accidental circumstances of the habitat. Several specimens labelled *Clavagella adenensis* and *Clavagella socialis* from both Aden and Djibouti were found in the Jousseume collection, including specimens which were probably the types. These four species are here considered synonyms of *Clavagella* (*Bryopa*) *aperta aperta* (Sowerby, 1823) since they are clavagellids with one free valve, embedded in chambers in limestone and coral, with large valves, an oval to figure-8 section tube and reflected tube ends. The presence of these specimens in the southern Red Sea confirms the records of Soliman (1971) and necessitates the extending of the range of this species to the junction of the Red Sea and the Indian Ocean.

Lamy also reproduced some notes by Jousseume on the early development and way of life of the large common Red Sea clavagellid *Brechites* (*Brechites*) *vaginiferus vaginiferus* (Lamarck, 1818). Jousseume speculated that this species commenced life as an ordinary bivalve with a planktonic larval stage before settling to take up the sedentary habit. From field observations, he described how the animal orientates itself perpendicularly in the sand with the open end of the tube protruding from the sand. The animal then draws water in through its protruded siphon and filter feeds like most other bivalves.

This paper, together with other work on this interesting family, leads me to speculate on the mechanism of tube development in the Clavagellidae. The tubes of these animals always have foreign bodies such as sand grains, stones and shells incorporated into their structure. However this foreign material is never attached to the valves. No growth discontinuities are seen along the length of the tubes, though in some specimens, tube repair and addition of length as extra plaited ruffles can occur. The other salient fact is that although a reasonable accumulation of specimens is available for study in the world's museum collections, in none of the major collections I have examined could I find what appeared to be a juvenile tube. From these facts the inference can be drawn that the valves and the tube are secreted at different times; that the valves are not in contact with the substratum when they are secreted; that the tube substance is in direct contact with the substratum when it is secreted and that the animal only secretes one tube in its life and that tube must be secreted as an adult-sized tube with the only possibility for growth being in length at the open end, but nowhere else. From this point it is therefore possible to put forward speculation on the processes that clavagellids might undergo to form the tube.

The juvenile clavagellids, after hatching, probably spend some time in the plankton with a normal bivalve shell as other bivalves. On settling they continue to grow until the body is much larger than the small bivalve shells. This "slug" stage may last for some considerable time. They then burrow into the substratum, orientate to a vertical position and expand their body by muscular and hydrostatic means into the adult tube size. They then secrete a calcareous shell-substance from all over their mantles to form the tube. This shell-substance, before it has hardened, picks up particles from the substrate. No similar mechanism of shell production is known for any other

bivalve, but in its essentials, this is the process that most nearly accounts for all the salient observations of this unusual family.

ACKNOWLEDGEMENTS

I would like to thank M. Simon Tiller of the Malacologie Department of the Museum National d'Histoire Naturelle, Paris for his kindness and great assistance in locating the material and literature on which this work is based. Thanks are also expressed to Ms. Rhyllis Plant for drawing the specimen and Mrs. Lyn Anderson for typing the manuscript. Thanks are due to the Science and Industry Endowment Fund, to Comalco (Australia) Pty. Ltd., to B.H.P. Ltd. and to the Council of the National Museum of Victoria for financial assistance to enable me to visit museums in Europe.

REFERENCES

- JOUSSEAUME, E., 1888. Descriptions des mollusques recueillis par M. Le Dr. Faurot dans la Mer Rouge et Le Golfe D'Aden. *Mem. Soc. Zool., France* 1 : 165-223.
- LAMY, E., 1923. Les Clavagelles et Arrosoirs de la Mer Rouge (d'après les materioux recueillis par le Dr. Jousseume). *Bull. Mus. Natn. Hist. Nat.* 19 : 104-107.
- SMITH, B.J., 1971. A revision of the family Clavagellidae (Pelecypoda: Mollusca) from Australia, with descriptions of two new species. *J. Malac. Soc. Aust.* 2(2) : 135-162.
- , 1976. Revision of the recent species of the family Clavagellidae (Mollusca, Bivalvia). *J. Malac. Soc. Aust.* 3(3-4) : 187-209.
- SOLIMAN, G.N., 1971. On a new clavagellid bivalve from the Red Sea. *Proc. Malac. Soc. Lond.* 39 : 389-397.